

(12) UK Patent Application (19) GB (11) 2 201 065 (13) A

(43) Application published 17 Aug 1988

(21) Application No 8802049

(22) Date of filing 29 Jan 1988

(30) Priority data

(31) 8702187

(32) 31 Jan 1987

(33) GB

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H04M 11/00 H04N 5/76

(52) Domestic classification (Edition J):

H4K OE

H3Q 14 15 200 6F 6U BCT

(56) Documents cited

GB A 2191066

GB A 2126002

EP A2 0166202

EP A1 0105932

US 4540851

(58) Field of search

H3Q

H4K

Selected US specifications from IPC sub-classes

H04M H04N

(54) Methods and apparatus for controlling video recorders over a communications link

(57) A video recorder 20 is controlled by apparatus 10 which responds to instructions received over a communications link 24 to emit infra-red pulse trains to operate the recorder. The apparatus is connected by plug 7 and socket 9 to a telephone line 24 and includes microcomputer 11 connected to a receiver 12 which records the repertoire of infra-red code signals taken from the customary remote device 21 used to control the recorder locally. An automatic answering circuit 15 responds to a call and a message generator 14 interacts with the caller to establish requirements for control of the recorder. The caller interacts by saying "yes" when the appropriate function, channel or time is reached in listings delivered from the message generator 14. Security section 16 requires a coded response from the caller to prevent unauthorized use. To log the repertoire of infra-red pulse trains as emitted by the customary hand-held remote control device 21, the apparatus has a sequence of lamps calling for input of signals in a given order.

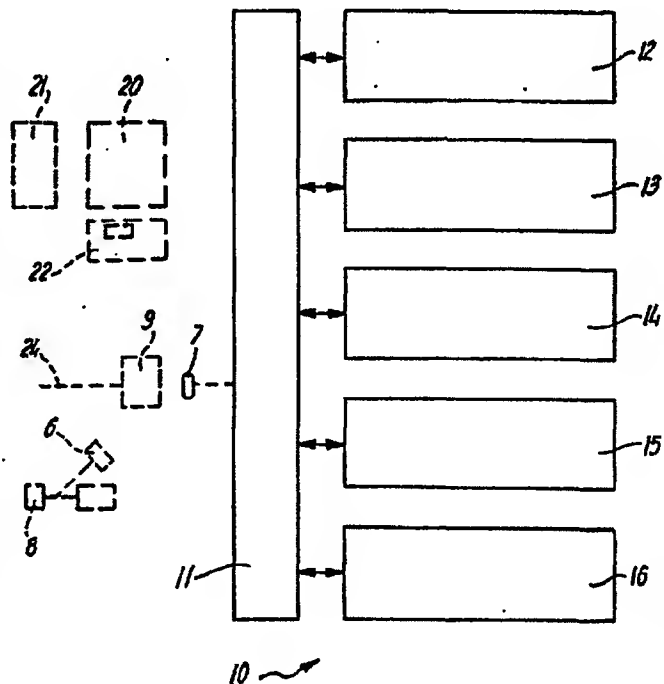
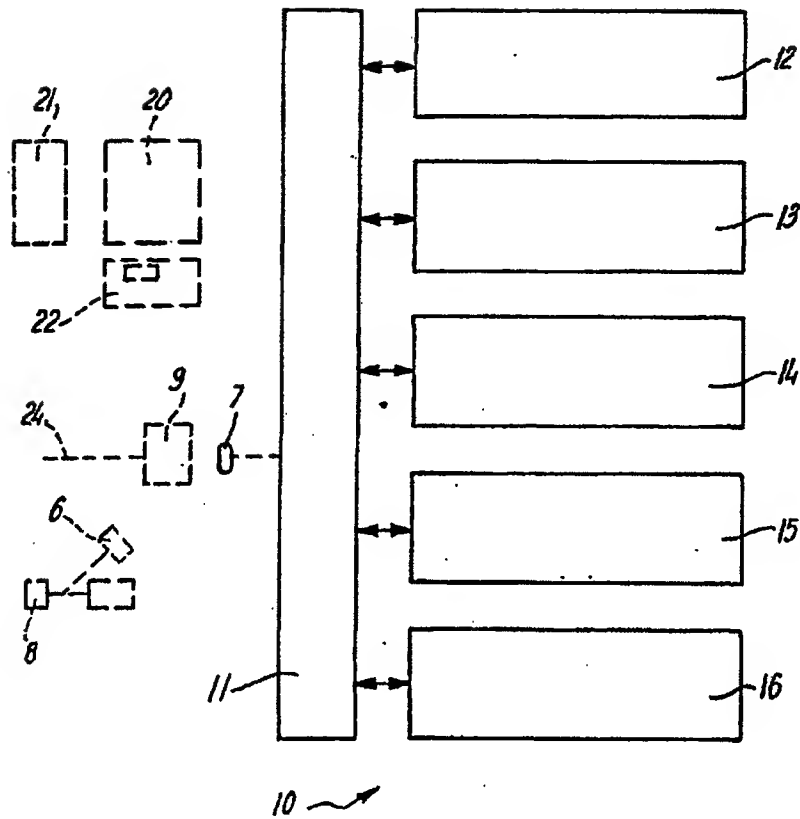
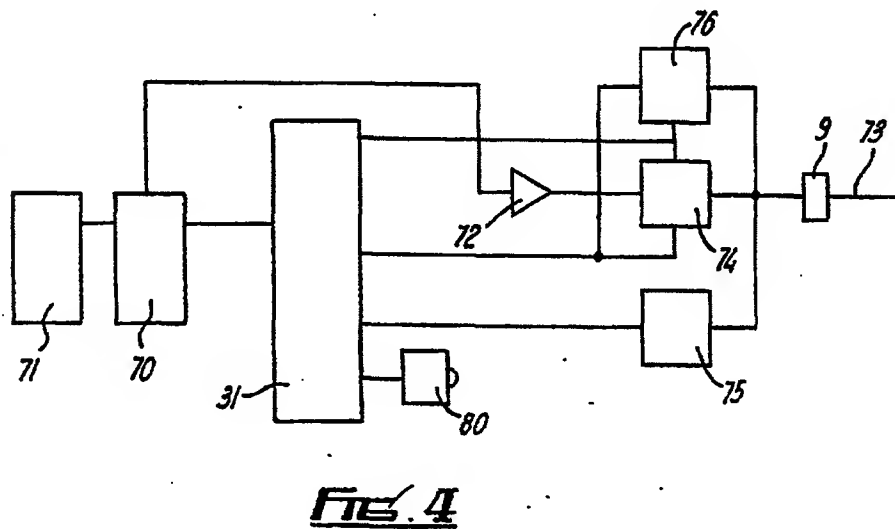
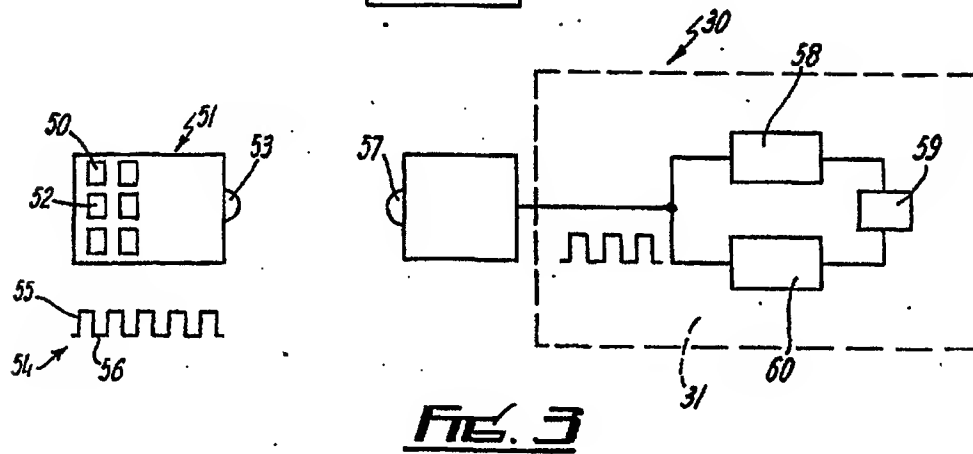
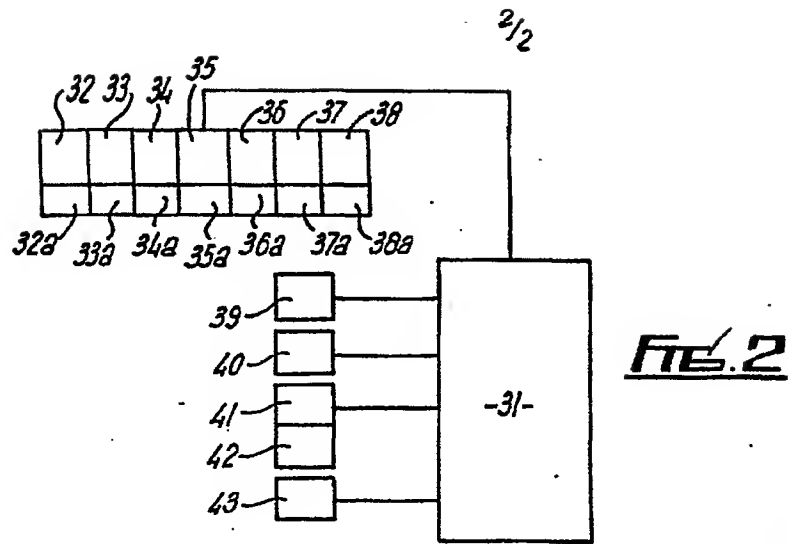


FIG. 1

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The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.

**FIG. 1**



METHODS AND APPARATUS FOR CONTROLLING
VIDEO RECORDERS

This invention relates to methods and apparatus for controlling video recorders.

5 According to one aspect of this invention a method of controlling a video recorder comprises providing apparatus for controlling the recorder, connecting the apparatus to a telephone line, and operating the apparatus by signals on the telephone line.

10 The signals on the telephone line may be produced by speech.

The apparatus may be remote from the recorder and be without direct connection to the recorder.

15 The apparatus may control the recorder by electromagnetic radiation.

 According to another aspect of the invention apparatus for controlling a video recorder comprises programmable means for storing instructions for operating the recorder, transmitting means for transmitting
20 instructions from the programmable means to the recorder, and communication means for sending and receiving signals on a telephone line to provide instructions for the programmable means to operate the transmitting means.

25 The apparatus may be arranged to be remote from the recorder and without direct connection to the recorder.

The transmitting means may emit electromagnetic radiation for controlling the recorder, for example infra-red radiation.

The programmable means may comprise store means for storing control codes for operating the recorder.

The programmable means comprises receiving means for receiving control code signals from a remote device, and
5 loading means for loading the store means with received code signals.

The loading means may comprise timer means responsive to on and off portions of an input pulse train representing a code signal.

10 The programmable means may include means for indicating to a user a sequence of instructions for programming the programmable means, and means for indicating when an instruction has been programmed.

The communication means may comprise means for
15 producing signals representative of speech on the telephone line.

The communication means may comprise a voice coder.

The apparatus may include security circuitry for preventing unauthorized use of the apparatus.

The invention may be performed in various ways and
5 two specific embodiments with possible modifications will now be described by way of example with reference to the accompanying schematic drawings in which:

Fig. 1 shows a control unit for the remote operation of a video recorder;

10 Fig. 2 illustrates a programming part of a controller;

Fig. 3 illustrates further a programming part; and

Fig. 4 illustrates operation of the controller.

Referring to Fig. 1 a control unit 10 is adapted to
15 be plugged by a plug 7 into a conventional socket 9 to which the cable of a conventional telephone (e.g. a hand set 8) is removably connectable, the telephone plug 6 having been removed.

The unit 10 enables a user to operate a video
20 recorder 20 in a room containing the socket 9. The video recorder 20 is a conventional recorder adapted for connection to a television receiver 22 and which can be remotely controlled by a hand-held device 21 which operates the recorder by infra-red electromagnetic
25 radiation. The device 21 has a number of operating elements which can be individually operated to obtain corresponding operative functions on the recorder for example to turn on the video recorder; start recording;

stop recording; rewind; select a particular television channel which is to be recorded. The device emits radiation in different forms corresponding to the different elements and functions, typically a different
5 set of pulses for the differing functions. The unit 10 comprises a main processor section 11 connected to send and receive electric signals to a receiver 12, a transmitter 13, a voice coder 14, a telephone adaptor 15, and a security section 16.

10 The receiver 12 has a receiver of infra-red radiation having reading circuitry to decode and store infra-red transmissions from the normal hand-held remote control device 21. After programming, the receiver 12 can mimic desired operating characteristics of the normal control
15 device 21. The receiver 12 may have store instructions for changing the selected TV channel in the recorder; and for initiating rewind and "start record" and "stop" in the recorder.

The transmitter 13 transmits to the video recorder by
20 infra-red radiation the instructions stored in the receiver 12.

The voice coder 14 has circuitry to communicate in phrases with a caller on a telephone line 24 connected to the telephone socket 9.

25 The telephone adaptor 15 has circuitry to respond to a telephone call on line 24 and, via the section 11, communicate with the voice coder 14 and security circuitry 16 in order to talk to, and receive verbal instructions

from, a caller on the line 24. The security circuitry 16 has a voice-operated electronic lock to prevent unauthorized use.

Operation of the unit 10 in one arrangement is as follows. A user would use the normal video remote control device 21 to program the unit 10. This would be achieved by the unit requesting the user by for example L.E.D. indication to activate particular buttons (operating elements) on the remote control device one at a time and in a sequence dictated by the unit, so that after programming, the unit 10 is able to mimic the instructional signals emitted from the remote control device. The unit 10 when thus programmed would not normally have to be re-programmed if it continues to be used with the same video recorder.

The video is left "on" with a tape in situ although to the unit 10 this tape would not have to be rewound. When the user activates the unit 10 via a telephone call, the voice coder 14 asks the caller for a security code. This may be done by a series of audible "pips" to the user with the user saying in reply e.g. 'GO' between some pips and not others, in effect creating a binary code. The unit 10 on receipt of the correct voice code would indicate this to the user and ask next for the desired TV channel e.g. by saying 'CHANNEL 1,2,3,4' allowing a pause between each number for the user to say 'YES', after the number of the channel it is desired to record. The next request of unit 10 would be "duration"

in half hour steps requested from the unit similar to the channel request up to a maximum of perhaps $2\frac{1}{2}$ hour duration. The "switch-on" time (i.e. the time at which recording is to start) could be set by the user the same way with a maximum delay of about $2\frac{1}{2}$ hours. Because the unit is user friendly the final stored information could be repeated back to the user in a quick reply e.g. 'CHANNEL 1, TIME 1 HOUR, START $\frac{1}{2}$ HOUR'. If this is correct, the user would replace the telephone. The unit 10 would then communicate with the video via the infra-red link from the transmitter by first telling the video to rewind and then setting the selected or desired channel. After a suitable delay to allow for rewinding, the unit 10 would instruct the video to "record"; and then "stop" after the run duration requested. It would be useful if after the first request to operate the unit, a further request could be made with the rewind cycle ignored until the user manually cancels the lock on return to the apparatus although it may be useful to ask the user via the telephone link if rewind is required.

The unit 10 is arranged not to accept rewind instructions on the telephone link which if carried out would interfere with "record" instructions already received.

In a modification the unit 10 is mounted on or incorporated in the video recorder.

In operating a video recorder by a remote control device a user operates for example a selected one of a number of buttons in the device to effect a desired function in the recorder. Operating the button causes a train of infra-red pulses to pass from the device to a detector in the recorder. Different buttons produce different trains of pulses. Different recorders may require different sets of trains of pulses for operation. Apparatus according to the invention may be adapted for use with a particular type of recorder having a particular operating set of pulse trains but preferably apparatus according to the invention is initially arranged for programming by a user's particular video recorder remote control device. Figs. 2 to 4 show such an arrangement.

The telephone operated video recorder controller 30 has a microcomputer 31 with connected to three of its inputs and nine outputs the following; indicating lamps 32 to 38, infra-red transmitter 39, infra-red receiver 40, push buttons 41, 42, audible bleeper 43. The operation to mimic the remote control is as follows. The operator presses push button 41 to start the sequence, this will be indicated by indicator 32 flashing along-side a visible instruction 32a to the operator to press the button e.g. 50 marked REWIND on the remote control device 51 for the recorder. The bleeper 43 will sound to indicate to the operator that ~~that~~ code input pulse train has been received and logged. The next indicator 33 will now start to flash next to a visible instruction 33a

asking the operator to press the key channel button 52
"ONE" this will be followed by another bleep and the
next indicator 34a flashing for channel "TWO"; and so on
pressing the various operating buttons. Indicator 35a
5 for channel THREE and indicator 36a for Channel FOUR.
Indicator 37a is for STOP and 38a for RECORDED.

All previous data is recorded in the controller 30
by means of time on and time off radiation pulses. The
way the controller collects the data pulse streams will
10 now be described, see Fig. 3. Remote control device 51
has button 50 pressed by the operator. Infra-red light
transmitter 53 starts to flash as a data stream of on off
pulses shown at 54 where the on peaks are 55 and the off
time is 56. Controller 30 receives the on off flashes by
15 means of radiation receiver sensor 57. The first light
flash period 55 received starts a timer 58 contained
within microcomputer 31. When this pulse is extinguished
the time duration of period 55 is logged in store 59 while
at the same instant a timer 60 takes over the timing of
20 the off period 56. When the next pulse 55 starts the off
time 56 stored in 60 is transferred to store 59 and timer
58 starts timing the next pulse 55, and so on. This
train of on off pulses is progressively stored in store
59 until the train is complete. The pulse trains
25 associated with the other buttons on device 51 are
similarly transferred to and stored in the controller.
Button 42 initiates a test sequence of signals from the
controller and observation of the recorder will show
whether the operation signals are complete and effective.

The controller can answer and communicate with a caller via the telephone line: In this example the telephone 8 is not disconnected from socket 9. The operation will be described by way of Fig. 4. Connected to the microcomputer 31 is a voice generator 70 and a read only memory (rom) 71 which may be contained in microcomputer 31. Also connected to voice generator 70 is amplifier 72 which may be switched to the telephone line 73 via and under the control of microcomputer 31 with an analog switch 74. 75 is a ring detector and 76 an analog switch. When a caller dials a telephone number to which the controller is connected the detector 75 senses the ringing on the line 73. After a set number of rings which in practice will allow the house owner to answer the telephone and thus abort the controller response, the microcomputer 31 via analog switches 76 and 74 accepts the call and starts a communication sequence of operations with the caller. This sequence of communication could be as follows. First, voice generator 70 generates the word VIDEO and via amplifier 72 and analog switch 74 transmits the statement to the caller via telephone line 73. The controller will now via microcomputer 31 disconnect voice coder 70 and amplifier 72 from the line 73 by switching off analog switch 74, and connecting the microcomputer 31 to the line 73 via the analog switch 76. A small wait period would start waiting for a response from the caller; any signal on line 73 in this wait period would be treated by the microcomputer 31 as a voice activated switch

signal and treated by the microcomputer 31 as an acceptance input indicating the caller requires access to the setting of the recorder. Now the sequence of setting the video parameters has started, the same procedure as
5 with the voice activated switch 70 will be repeated, ceasing each step as acceptance is logged. The sequence is as follows (the words in brackets the callers response). VIDEO pause (yes), REWIND pause (yes), CHANNEL ONE pause TWO pause THREE pause FOUR pause (the caller would keep
10 quiet until the channel required is reached and during the next pause says yes: this will abort any further channels being asked); TIME NOW pause HALF pause ONE pause ONE HALF pause TWO pause (the callers response is the same as for channel keeping quiet until the time is
15 reached saying yes during the appropriate pause); DURATION HALF pause ONE pause ONE HALF pause TWO pause CONSTANT (the callers requirement is logged as previously with a yes response at the appropriate pause which aborts further requests). The controller will now repeat back
20 to the caller the stored request for example: REWIND YES CHANNEL TWO TIME HALF DURATION TWO pause (if the settings are correct the caller replaces the receiver or if wrong will say no and the controller will go through the sequence again). If the controller receives another
25 caller repeat of the already stored transmission would be useful before entering the sequence required by the new caller and to save time leaving "rewind" out of the request. When the caller accepts the settings relayed to the caller the microcomputer 31 will retrieve from memory
30 the stored infra-red data strings or trains in sequence of the required operation e.g.: REWIND, CHANNEL TWO. The controller will now wait half an hour before sending the RECORD signal and after two hours send a STOP signal to the recorder, via transmitter 80.
35 If there are a larger number of channels, for example twenty four, the channel selection sequence can

be modified. Thus the controller will say 'one to six' and if channel eight is desired, the caller will make no response in the pause; the controller then says 'seven to 12' and the caller then says 'yes'. The
5 controller then starts the sequence 'seven pause eight pause, and so on and the caller says 'yes' in the pause after the selected channel.

The term telephone line is intended to include all means of inputting an electrical command signal to the
10 controller, preferably speech initiated, and includes inputting via a satellite and dish aerial.

CLAIMS

1. A method of controlling a video recorder comprising providing apparatus for controlling the recorder, connecting the apparatus to a telephone line, and
5 operating the apparatus by signals on the telephone line.
2. A method as claimed in Claim 1, in which the signals on the telephone line are produced by speech.
3. A method as claimed in claim 1 or claim 2, in which
10 the apparatus is remote from the recorder and without direct connection to the recorder.
4. A method as claimed in any preceding claim, in which the apparatus controls the recorder by electromagnetic radiation.
- 15 5. Apparatus for control of a video recorder comprising programmable means for storing instructions for operating the recorder, transmitting means for transmitting instructions from the programmable means to the recorder, and communication means for sending and
20 receiving signals on a telephone line to provide instructions for the programmable means to operate the transmitting means.
6. Apparatus as claimed in Claim 5, which is remote from the recorder and without direct connection to the
25 recorder.
7. Apparatus as claimed in Claim 5 or Claim 6, in which the transmitting means is adapted to emit electromagnetic radiation for controlling the recorder.

8. Apparatus as claimed in any of claims 5 to 7, in which the programmable means comprises store means for storing control codes for operating the recorder.
9. Apparatus as claimed in Claim 8, in which the
5 programmable means comprises receiving means for receiving control code signals from a remote device, and loading means for loading the store means with received code signals.
10. Apparatus as claimed in Claim 9, in which the
10 loading means comprises timer means responsive to on and off portions of an input pulse train representing a code signal.
11. Apparatus as claimed in Claim 9 or Claim 10, in which the programmable means includes means for
15 indicating to a user a sequence of instructions for programming the programmable means, and means for indicating when an instruction has been programmed.
12. Apparatus as claimed in any of claims 5 to 11, in which the communication means comprises means for
20 producing signals representative of speech on the telephone line.
13. Apparatus for controlling a video recorder substantially as hereinbefore described with reference to and as shown in Fig. 1, or Figs. 2 to 4, of the
25 accompanying drawings.